# Self-organized Routing for Radial Underwater Networks

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# Problem Statement

- Localization is difficult in UWSN
- Most of the existing routing protocols are based on location.
- Few location free protocols are proposed which are based on additional resources like AUVs or some kind of measuring device.
- A self-organized location free protocol is needed which does not require any additional resources like pressure measuring devices or AUVs or time synchronization.

# Literature Survey

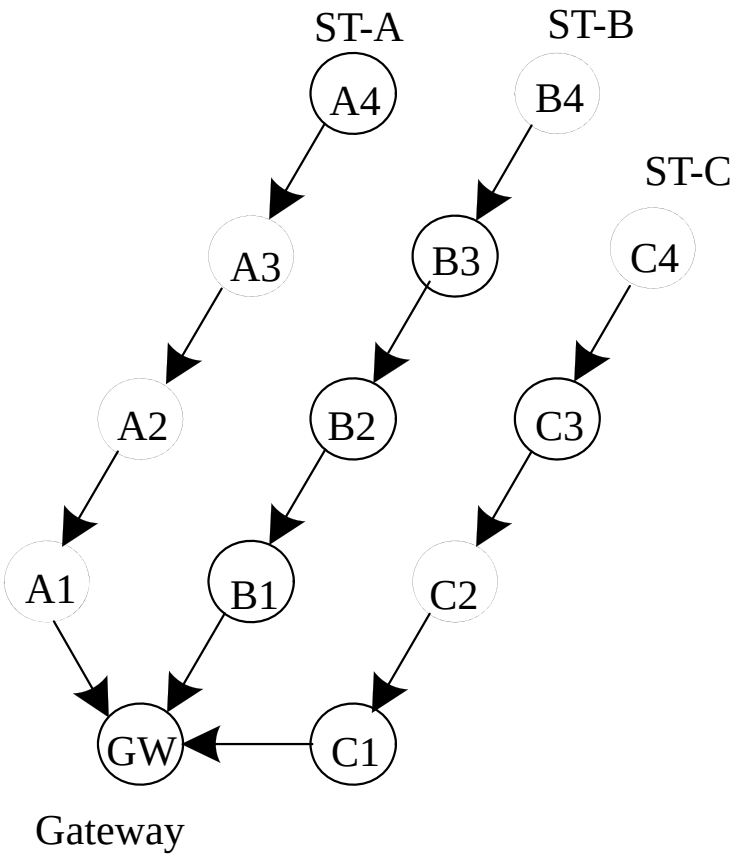
- Location based routing based protocols are not suitable for UWSN.
- Location based routing protocols which depend on Time of Arrival (ToA) or Angle of Arrival (AoA) require time synchronization and measuring equipment. [1, 2]
- Some location based protocols use AUVs [3 – 7].
- DBR [8] is a location free routing protocol and uses pressure sensors to estimate depth.
- LFLR [9] is also a location free protocol and it also uses pressure sensors to estimate depth.

# Research Objectives

- Design a routing protocol having the following characteristics:
  1. Self-organized
  2. Location-free
  3. Energy Efficient
  4. Support real time Multimedia traffic
  5. Fast Converging

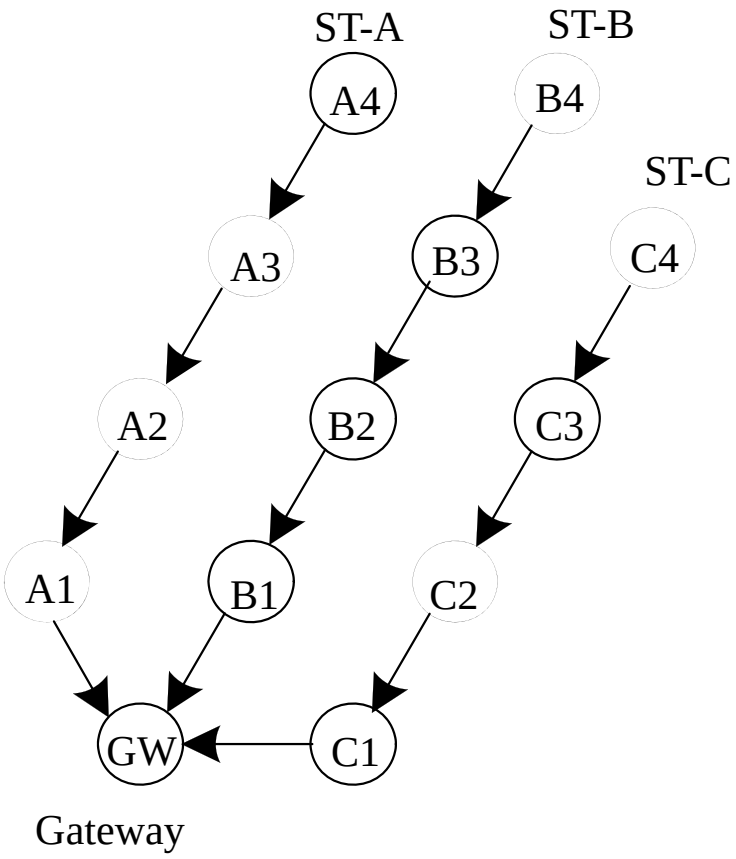
# Proposed Routing Protocol

- Forms straight routing paths called strings.
- Each node, in the straight path, forwards packets of the nodes above it towards the gateway (sink).
- Gateway initiates path formation by identifying its next hop neighbors.
- To identify the next hop neighbors the gateway broadcasts a request packet.
- After identifying the neighbors, the gateway initiates string formation process by broadcasting a route request packet.



# Proposed Routing Protocol

- The nodes forward the route request packet first.
- The nodes in the string (line) send back acknowledgment.
- When the last node in the string is reached a response packet is sent back to the gateway.
- This way all the nodes know their respective strings.
- The gateway also has complete knowledge of all the nodes and their respective strings.
- The middle node sends route request packet after the side node to avoid the collision.



# Conclusion

- The protocol does not require the location information to form the routing path.
- Since the routing path is predefined, the nodes takes minimum time to forward the packet.
- For a network of 24 nodes the complete period to form the routing paths is approximately 210 sec (3.5 mins).
- Keeping the high propagation delay in mind, this protocol considerably converges fast.
- Number of packets to form the path is not too large.
- It is energy efficient because it avoids collisions.

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